APPENDIX F

LOW CARBON TRANSPORTATION AND FUELS INVESTMENTS AND THE AIR QUALITY IMPROVEMENT PROGRAM

Fiscal Year 2016-17
Off-Road Advanced Technology Demonstration Projects

DATA COLLECTION REQUIREMENTS

Mobile Source Control Division
California Air Resources Board
June 9, 2017

California Environmental Protection Agency
Air Resources Board

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Table F-1 below lists the minimum requirements for data collection elements to be collected as part of a project requesting funding under this solicitation; additional data may be collected beyond what is presented below.

Table F-1. Minimum Data Items: Off-Road Vehicle/Equipment

Vehicle / Equipment Specification
• Vehicle specification (e.g., manufacturer, model, model year, gross vehicle weight, fuel capacity etc.). • Full propulsion system specification, including legible engine label photos.
Vehicle / Equipment Operation
• Vehicle usage, e.g., hours of operation per day, days of operation per year, odometer reading. • GPS data (must be able to distinguish between key off and key on but not moving) if vehicles are operated outdoors. • General description of daily use of vehicles/equipment. • Duty cycle logging and load analysis. • Average speed and idling time (if not already captured in the duty-cycle logging, also applicable to yard trucks). • Odometer reading (beginning and end of each shift, also applicable to yard trucks). • Measure or estimate the weight of each load/lift (applicable to forklifts and top handlers); weight of load per container moved (applicable to yard trucks). • Workflow modifications with advanced technology vehicles/equipment, if any.
Vehicle / Equipment Performance
• Performance during normal work week vs. peak (i.e., holiday, overtime, double shift, high temperature or low temperature etc.). • Vehicle productivity/performance profile (acceleration, lift/lower speed, ramp speed) – beginning (full battery/tank) vs. end of shift (low battery/tank). • Comparison of an appropriate productivity metric with advanced technology vs. baseline vehicles (i.e., forklift/lifting equipment: pallets moved per shift or day; yard tractor: container pulls per shift or hour). • Battery degradation (battery charge capacity/power output over the length of the project).
Fuel / Energy Consumption
• Amount of fuel/electricity; date; fuel price per unit when a vehicle/equipment is fueled (include electricity rates as applicable). • State of charge (SOC) throughout work shift (minute-by-minute), if applicable. • Refueling time/charging time. • Distance traveled to refuel/charge if fueled off-site. • Refueling/charging source (e.g., on-site energy storage, grid, delivery, etc.). • Off-peak and/or renewable energy load shifting potential (e.g., battery recharging optimization with smart meter). • Refueling/charge frequency. • Fuel efficiency, energy consumption rate per work completed/distance driven and Fuel/energy consumption while idling (if applicable).

Maintenance
• List of systems for both baseline and advanced technology vehicles/equipment for which preventative maintenance is regularly scheduled and anticipated frequency of scheduled maintenance. • Type of maintenance: scheduled and unscheduled. • Repairs: date, description of problem, description of repair performed, parts replaced, costs of parts replaced, costs of labor. • Time out of service with an explanation of reason for any extended delay.
Service Calls
• Date of service call, description of problem, description of repair performed, parts replaced, odometer reading. • Time out of service. • Service response time to new trouble call.
Safety
• Description of any accidents or incidents, including collisions, maintenance and fueling incidents.
Emissions Testing
• Tailpipe emissions test for vehicles/equipment that are not 100% zero emission, and their respective baseline vehicles/equipment using PEMS technology.
Fueling / Charging Infrastructure and Maintenance Infrastructure
• Infrastructure facility description, including station throughput/capacity, for both fueling/charging station and maintenance bay. • Infrastructure reliability.
Capital Costs
• Capital costs for advanced technology vehicles and baseline vehicles, or cost of vehicle upgrade. • Infrastructure/facility capital costs or cost of facility modification/upgrade, for both fueling/charging station and maintenance bay.
Operating and Maintenance Costs
• Detailed operating costs for both baseline and advanced technology vehicles/equipment. • Detailed maintenance costs for both baseline and advanced technology vehicles/equipment, including parts and labor (total labor cost and mechanic labor cost in $/hour). • Fueling infrastructure and maintenance infrastructure O&M costs (e.g., type of maintenance, costs for parts and labors, problems). • O&M costs for facility safety systems related to hydrogen and fuel cells (e.g., type of maintenance, costs for parts and labors, problems), if applicable.

User / Fleet Experience Survey
• User/fleet experience of the advanced technology vehicles/equipment, e.g., vehicle availability, power, capacity to meet fleet operation demand, O&M challenges, service parts availability, perceived safety, refueling experience and any barriers. • Describe the workforce training programs, if any, related to the use and maintenance of the advanced technology vehicles. Evaluate the effectiveness of such programs and the costs associated with them. • Describe warranty claims and insurance policies, as well as the experience of working with vehicle/equipment manufacturers in the instance of an accident or a major period of unexpected down time (as applicable). • The vehicle manufacturer response/service for warranty claims and/or trouble shooting.